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THE NEPHRITE QUESTION.*

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The term nephrite question or jade question has been applied to an ethnologic problem which if not fully solved appears to be very nearly so. The time will come when it will be a matter for surprise that it was ever looked upon as a problem at all. The "jade question" is as follows:

In nearly every part of the earth, especially America, Europe, Asia, and New Zealand, objects of a very hard and generally green stone, in the shape of hatchets, jewelry, etc., are found. They are discovered in mounds, prehistoric settlements, etc. Similar objects are still worn by wild and uncivilized peoples, and also by the highly civilized. The origin of these objects is in many cases inexplicable, since Asia and Oceanica are the only places within our knowledge where the crude material may be found.†

It is now supposed that the American objects owe their origin to Asia, whence they were carried to Europe and by chance to America, as well as directly from Asia to America. This is the opinion of Prof. H. Fischer, of Freiburg, in Baden, and of a great many other savants in Europe and in America.

I shall try to prove that this theory is untenable and that the occurrence of these objects must be otherwise explained.

The nephrite question should properly be called the jadeite and nephrite question, because not one but two minerals are concerned which resemble each other in appearance and which are to be distinguished from each other only by specific gravity, chemical analysis and microscopic examination. Both minerals, as nature produced them, have not as yet been fully tested and their value is therefore

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* Abstract of Dr. Meyer's paper entitled *Die Nephritfrage kein ethnologisches Problem. Berlin*, 1883.

† Lieut. G. M. Stoney has found nephrite in place in Alaska at a locality known as the Jade mountains, near the Kowak river, about 150 miles above its mouth. A report upon the chemical and microscopical composition of the mineral by Prof. Clarke and Mr. Merrill will soon appear in a Bulletin of the U. S. National Museum.—*Eds.*

in doubt, but the future may bring forth much information, as a number of scientists have undertaken their study.

The term nephrite very likely means "kidney stone" and it originated in the belief that the stone externally applied would cure kidney disease. This idea was adopted by the Spanish in Mexico and they called the stone in consequence piedra de hijada, out of which the French and English made "jade." From this word Professor Damour, of Paris, made the word "jadite" and classified it as a mineral similar in external as well as internal appearance to nephrite, but differing from it in various ways.

The systematic classification of jadeite is less positive than that of nephrite. Lately it has been placed amongst the pyroxenes, as having a close resemblance to the amphibolean mineral group to which augite belongs. While the opinion formerly prevailed that the specific gravity of jadeite was 3.3, it has been found weighing as low as 2.8, having consequently a specific gravity similar to that of nephrite; it cannot therefore be positively asserted that differences in density are sufficient to separate the two minerals.

A third mineral was likewise separated from jadeite by Professor Damour, who named it, on account of its color, chloromelanite. This has a higher specific gravity than jadeite, being from 3.4 to 3.6. Owing to the larger quantity of iron it contains, it is of a much darker color, being nearly black; but, since it has been discovered that objects exist consisting in part of jadeite and in part of chloromelanite, the latter is not now separated from the former even as a variety, and hence only the terms jadeite and nephrite are used, the specific gravity of the two ranging from 2.8 to 3.6.

Jadeite is as hard as nephrite and in color it resembles the latter in every stage from white to nearly black, through green and brown; at its ends and edges and in thin layers it is just as transparent, and in chemical composition it only differs from nephrite in showing clay and soda (Thonerde und Natron). Microscopically examined, the two can be readily distinguished.

Objects made of the Turkistan nephrite were manufactured in many places in India, particularly in Kashgar and Yarkand. Beautiful specimens of this kind are in the valuable collection of the South Kensington Museum, London, of which the catalogue shows 250 jade objects from India and China; among these is a bowl that belonged to the Mogul Emperors Ishanger Shah Jehan and Aurungzebe and that cost them for workmanship (paid to one family of artistic

workmen) over 6,000 pounds. This bowl at the present day, either in China or Japan, would be worth double the amount.

The first-named Mogul emperor took a particular fancy to mosaics made of nephrite. Rubies, diamonds, and other precious stones were inlaid into different-colored nephrite with enamel in peculiar patterns, in the manufacture of which India has no rival. The most renowned work of the kind is the tombstone of the wife of Shah Jehan, known as Taj Mahal.

Even to this day nephrite is considered a precious stone in India, as the present of Rajah Tagore, of Calcutta, to the Dresden Museum indicates. This consisted of 25 different stones, some worked into objects and some only cut; among the first named was a dirk handle made of nephrite. Sword handles of this mineral are prized very highly throughout the whole of the Orient and Turkey. In the green vaults at Dresden there is a nephrite sword handle of cream color, which it is said was taken from the Turks in front of Vienna in 1683; it is studded with 114 diamonds, emeralds and rubies. The tombstone of Tamerlane at Samarcand, which has been well known since the beginning of the fifteenth century, is two meters long and is made of nephrite. But in China nephrite plays a still more important rôle and has done so for years. Chonoring, 2737 B. C., decorated himself with it, and mention is made of a pillow of nephrite which belonged to the Emperor Chan-Sin, 1154 B. C., on which he always slept with Tau-ki, the celebrated courtesan. At Barkul stands a memorial stone of nephrite, named Tsin-Tschanbey, upon the polished side of which General Tschan personally cut the dates of victories and battles he fought 3,000 years ago.

Nephrite does not now reach China from Turkistan, but it is very likely that the present demands for the mineral in China are supplied from other places in Asia. The known finds in Siberia do not adequately supply China, but a great quantity comes from Barma, the jadeite from there being of light specific gravity. Many objects which come from China may have passed for nephrite, because the articles, owing to their costliness, did not undergo chemical or microscopical analysis and, furthermore, because their genuineness was never suspected. The jadeite mines in Barma give the king a considerable revenue. In the year 1836 it was about 70,000 marks, but latterly the royalty has fallen off considerably.

Professor Anderson, of Calcutta, who, during his expedition to West Yu-Nan, via Barma, in the years 1868–1870, first gave us particu-

lars respecting these mines, states that in the Mogung district, 25 English miles southeast of Meinkum, there are, at times, as many as 1,000 men employed in the vicinity of the Irrawaddy. Each miner pays about 2 marks (50 cents) monthly dues and has all that he finds. The dealers pay from 3 to 5 marks admission fee to the mine, besides a monthly due of 3 marks and an export duty of 10 per cent.; even the little ponies used for carrying are taxed.

Mogung, which is about 60 miles distant from the mines, is the principal trading place for jadeite. From there the article goes down stream to Bhamo and on the Irrawaddy to Rangoon, to be thence shipped to China, and also overland from Bhamo to Momien, in the Chinese province Yu-Nan, where there are works for the domestic manufacture of finger and arm rings, buttons, pipe-stems, etc. In Momien the cost of a pair of bracelets, best quality, is about 200 marks ($50). A ring may be bought in Bhamo for 7 marks which would cost 40 marks in Canton. One-quarter of the population in this town is employed in cutting stones. The King of Anam is in possession of a block of jadeite valued at 150,000 marks; besides this there are a number, of even greater value, which are not too large to be placed in a fire-proof safe.

Particular interest attaches to the fact that Professor Anderson found hatchets of jadeite in the Sanda valley, in Yu-Nan, the more so because this is the first authentic discovery of hatchets of this material in China. The one in the mineral museum at Vienna marked "China" is of doubtful origin. At Cambodia a similar hatchet is said to have been found. Nephrite hatchets in East Asia are known to have come only from Japan. It is generally stated that the material for the Japanese hatchets came from China, but this is simply because no raw material has been known in Japan till now. Some of the hatchets, it is said, are even now in use in the northern provinces and islands of Japan.

In Asia Minor, so far as known, only a few hatchets of nephrite and jadeite have been discovered; these came from Troy and were found by Dr. Schliemann.

In Switzerland a number of hatchets, chisels, etc., have been found—as many as 490 nephrite instruments, for instance, on Lake Leman. Except in the western part, few jadeite hatchets were found.

The largest known nephrite hatchet from Switzerland measures 12*cm*. Of the number of jadeites known from this country, over

100, the largest is 21.4*cm*. It is believed that a factory was once situated in Maurach, 154 remnants, two blocks on which sawing was commenced, and an unfinished hatchet having been discovered along the shore. The finds of large, sharp, flat, and pointed hatchets in West Germany and France are nearly all of jadeite. They were found in the earth and in graves, and, in part, are supposed to have come down from the Romans. From France over 100 large, flat hatchets are known, distributed over 44 departments. One only (at Rheims) is of nephrite. All the others are of jadeite, and nearly all these have a high specific gravity.

In Germany over 80 hatchets made of jadeite are known, and only a very few of nephrite, the latter being from the southern part of Baden and Bavaria.

From other European countries hatchets are known as follows: Belgium (?), Spain (jadeite), Portugal (jadeite), Denmark (?), various places in Austria (jadeite), and also Italy (jadeite and nephrite).

Up to the present time only a small number of European hatchets of jadeite and nephrite have been discovered. *Where do they come from?* No raw material has been found in Europe, or at least not in such quantity that any one has ever attributed the origin of the worked hatchets to that country.

Professors Lindenschmidt, of Mainz, and Schaffhausen, of Bonn, believe that the Romans brought these hatchets to be used during ceremonies of making treaties etc., but this view seems to be unfounded, since the large hatchets are exceedingly rare in Italy, none of the Roman writers making any reference to them, and not even a Latin name exists for them.

Professor Fischer has attempted to solve the problem on the hypothesis that the material for the various nephrite and jadeite objects in Europe originated in Asia, where we know that Indian, Barmese and Siberian finds of raw material have been made; the material for nephrite objects, if not traceable to Asia, he thought might have come from New Zealand, since in that far east nephrite was found as rock as early as the end of the last century by Reinhold Forster, the German naturalist who accompanied Captain Cook.

Professor Damour, who has made a study of the question in France, is of the opinion that the mountains there have not been sufficiently explored to warrant a positive assertion that jadeite is not native.

De Mortillet, the French archæologist, states that the jadeite hatchets found in various parts of France invariably differ in character, and he believes that these differences of variety are peculiar to each locality.

It may be that the people of prehistoric times continually sought the valuable material in a way quite different from the one we adopt. That bowlders in the rivers formed their main source of supply is proved by the fact that a large number of the hatchets show the bowlder characteristics, and they certainly left no stone unturned in their endeavor to find them, while we never think of looking for them in rivers. They may also have searched for still greater finds, the last view being supported by the fact that finds have been made as late as the last century in North Germany, in the sand near Potsdam, at Schwensal, near Merseberg, and at Leipzig, and these were evidently nephrite bowlders of the North German diluviums. The remarkable block at Leipzig weighed over 38*kg.*; it is looked upon by Professor Fischer and others as having been accidently lost at that place, and they think that the raw material is of Asiatic origin. Considering that the block weighed nearly 100 pounds, this is not very likely, and I am of the opinion that this nephrite bowlder came from Scandinavia and that it was transported by ice.

The recent discovery of Felsenschliffe, as well as the finding of many other varieties of northern bowlders near Berlin, Leipzig, and other places in the lowlands of North Germany, proves that the whole of North and a part of Middle Germany were subject to the action of glaciers. The presence of nephrite may be explained in the same manner.

That no nephrite has as yet been discovered in Scandinavia does not disprove its existence there, since the most competent northern geologists believe that their lands have been by no means fully explored. For instance, about 70 basalt-knobs in the supposed thoroughly examined province of Schonen have been overlooked till recently. Many other rocks and minerals lately found in Germany are known to have a northern origin, but their precise home we do not positively know; for instance, the phonolite found in Mecklenburg on the Oder.

I therefore do not hesitate to look for the home of these nephrites in the North, and I believe that their distribution has been natural and has not been effected by human action. These nephrites, however, have nothing to do with the large jadeite hatchets, the origin

of which must be different. The conclusion reached as to the three North German nephrite blocks, whatever it may be, will not settle the latter question, but it suggests that thorough investigation of Germany may lead to the discovery of a great many things; for instance, only a short time ago there was a find of variolite in Silesia, which till then had been known only in the Maritime Alps (Southern France).

By the discovery of a piece of crude jadeite at Monte Viso, in Piedmont, Professor Damour may possibly have found the source of the material of the flat jadeite hatchets. Professor Fischer thinks that this piece came from Farther India in prehistoric times, a belief I do not at all share. Professor Damour also discovered a bowlder, similar to jadeite and as hard, near Ouchy, on Lake Geneva; but, even if the fact that this piece has the same chemical composition as jadeite be fortuitous, the material would still have answered for hatchets; the points involved cannot be decided so long as the composition of the flat hatchets of France and Germany is so little known. Positive proof of such an interesting discovery as the above would indicate that many new objects may still be found in well-known places, as, for instance, on Lake Geneva. Should jadeite ever be discovered in the Western Alps, then an explanation of the German and French hatchets would not be far to seek.

The case is nearly the same with the objects of nephrite and jadeite of the Swiss prehistoric lake settlements (Pfahlbauten), whose native place is also looked for in Asia or even New Zealand, whereas the origin of the crude material may be very near. Sir John Lubbock argued for the Asiatic origin in 1865, and only lately Professor Fischer argued for the New Zealand origin. These claims rest solely upon the possibility that the Barmese jadeite and the Siberian or New Zealand nephrite might have been transported to the Swiss lakes, but the manner in which such transportation could have occurred is not at all obvious.

The difference in size between the large French and German hatchets and the small Swiss tools leads Professor Fischer to suggest that immigrants and travellers may have brought the green hatchets from their homes and, finding no crude material on their route, divided them as their families increased to give a piece to every member. But the learned professor seems to have insufficiently considered the character of the bowlder (Gerollcharakter) from which the Swiss nephrite and jadeite objects have almost always been

made; this character would have disappeared on dividing the implements, aside from the fact that such a division was not at all likely on other grounds. The smallest of the pieces, together with the Gerollcharakter, indicates that the lake-dwellers searched for the crude material in their streams, and we should perhaps be able to find it now if we looked for it as they did. No stone was left untouched in the bottom of a stream and each was thoroughly examined and tested; out of hundreds of thousands perhaps but a single piece of nephrite or jadeite was found.

Professor Ranke, of Munich, correctly states that the inhabitants of the time knew the stones better than the modern generation, which does not require them for tools. Their eyes may have been keener than those of our mineralogists. Prof. V. Fellenberg, one of the best judges of Swiss minerals, in support of the statement that the country has not been properly explored, remarked that white saussurite in blocks has been discovered on Lake Biel, which had heretofore only been known from the Matterhorn. The origin of many varieties of stones from Wallis, which are found as blocks in the old glacier of the Rhone, especially along the south banks of Lake Biel, has been unknown till recently, and lately a block of an amphibolite with olivine was discovered in the Inner Jura, the origin of which is quite unknown. The same authority is of the opinion that if nephrite and jadeite should be discovered it will be in the Southern Wallis Alps.

Since Dr. Arzruní, of Berlin, discovered by microscopic examination that the Swiss nephrite differs from that of Siberia and Turkistan, the belief that the crude material is to be found in Switzerland can no longer be treated as an unsupported hypothesis; it is more than a hypothesis, imposing on the investigator the necessity of finding it there, which he will do if he look for it long enough.

Turning now to America, it is remarked that the jadeite and nephrite objects there have no real bearing on the question whether the American continent was peopled from Asia.

In the Americas about 100 objects of jadeite are known, but they are scattered all the way from the North to the Argentine Republic, most of them coming from Mexico and Central America. There are not only hatchets and tools, as in Europe, but also and chiefly amulets, sculptures, and the like, often of fine workmanship and beautifully polished. Alexander von Humboldt, who brought from Mexico a splendid sculptured jadeite hatchet, remarked that the

great rarity of this rock renders more astonishing the fact that a great number of nephrite hatchets may be found by digging in former inhabited places all the way from Ohio to the mountains in Chili.

The Bremen Museum recently received in one consignment from Costa Rica eleven large jadeite objects, four of which were found together in one grave. How many more are still to be found in these unexplored regions cannot be told. The sculpturing of these objects is typically American, as indicated not only by the faces carved upon them, but by the special Mexican calendar signs, and consequently there can be no doubt that they were made in the region where found.

The long, thin plates from South America (Venezuela and New Grenada), which Humboldt looked upon as bell or sounding plates, are particularly interesting. They were suspended by a cord passed through a hole drilled in them, and when struck with a wooden staff a strong, clear note is given.

The cylinders made along the Amazon and worn by the inhabitants as ornaments or indications of rank are also very interesting.

The belief expressed by Professor Fischer that the crude material of all the nephrite and jadeite objects found in Mexico and Central and South America came from Asia, that wrought objects found their way to America by migration from Asia or by trade and were worked over again there, is not well founded.

The two principal grounds for the hypothesis of the Asiatic origin of the raw material are as follows:

First. No crude material has yet been discovered in America.

Second. For every wrought piece in America an exact duplicate of crude material may be found in Asia.

It is possible that the Spaniards in Mexico may have known where jadeite existed in place and that later the knowledge of these localities was lost. Clavigero tells us that formerly every prominent person who died had an emerald placed on his lips, but in his time (1780) this mineral was no more worked, nor even were the finding places known. Some of the churches, however, still possessed enormous pieces, which were guarded and prized very highly.

Professor Damour differs from Professor Fischer and does not doubt that in Mexico and possibly in the vicinity of the Amazon river jadeite will yet be found.

That a duplicate of every American jadeite object is to be found

in the crude material of Asia is of no consequence, since the variation in colors of this mineral invalidates the conclusion which might otherwise be drawn from that fact. The rock varies in America and it varies in Asia. Everywhere that jadeite and nephrite have been found they are represented by many varieties, as, for instance, in the case of the Siberian, New Caledonian, and Barmese material.

Certain Siberian crude nephrites look so much like those of New Zealand that it is difficult to discriminate them, and yet we know that the nephrite is as much at home in New Zealand as in Siberia; consequently, if Asiatic crude material is in composition like American-worked objects, the conclusion that the latter must necessarily be made of the former is not valid.

It is known that formerly in Mexico (as in China) the tribute of certain parts of the country was paid in nephrite and jadeite, and it is not likely that such payment would have been made of a material not native to the country. In Mexico, amongst other things, necklaces of green stones were paid as taxes. Now, the necklaces of green pearls found in graves prove to be of different materials, only a portion of them being jadeite; this indicates that the latter were not considered of more value than the others and may not even have been known specially as jadeite, which would not have been the case had they been foreign, particularly if they had come from such a great distance as the crude material is supposed to have done.

Not only in Asia, Europe and America has the nephrite question been studied for the purpose of ascertaining the prehistoric relations of the people, but in Oceanica it was examined for the same purpose.

It was in New Zealand that the first nephrite hatchets and amulets as well as the raw material were brought to our notice. During the wars between the natives they played an important part, and even at the present time certain war hatchets of nephrite (mere) are very valuable.

Next to New Zealand comes New Caledonia as a source of nephrite. Large oval hatchets were in use there, with which enemies were slaughtered and cut into pieces. Tools in singular wooden handles and long necklaces made of numerous nephrite beads were abundant.

It appears that the inhabitants of Loyalty island and New Hebrides received their nephrite for axes from New Caledonia.

According to Jules Garnier, to whom we owe the discovery of the nephrite rocks in New Caledonia, transparent edges along the rocks are to be found and the variety in color is striking, ranging as it does from nearly white through almost every shade of green and brown to nearly black.

While New Zealand and New Caledonia claim the production of nephrite, the northern coast of New Guinea furnishes jadeite in the form of tools used in wooden handles, but its source has not been discovered; doubtless it is in the island, and the bowlder character of the pieces points to the streams as the place where it was obtained.

By following on the chart the line which designates the places for nephrite and jadeite in Oceanica, New Zealand, New Caledonia, and New Guinea one arrives at Farther India, the principal source of the Asiatic jadeite. In forming the hypothesis of an Asiatic origin of the European and American jadeite, too little attention would seem to have been given to the testimony of Oceanica. The discovery of worked objects has everywhere preceded that of the source of supply of the crude material. In Europe the attention of discoverers has only lately been turned to this question. In America it has been more fully considered, but the region where the jadeite occurs is very extended; nevertheless I do not doubt that investigation will result in the discovery of the finding places in Europe as well as in America, as was the case in Asia and Oceanica, and such discovery will divest the nephrite question of its ethnological character.

Finally it may be mentioned that objects of jadeite and nephrite have been found in Africa (Egypt and Sahara), the origin of which is as yet unknown; of course it has been surmised that here also there may have been connection with either Asia or New Zealand, an utterly unjustifiable hypothesis.

The following conclusions seem to be warranted:

1. *The nephrite question is not an important ethnologic question.*

2. In Asia we know as finding places of nephrite Siberia and Turkistan; of jadeite, Barma; but it is supposed that there are others as yet unknown. Prehistoric Asiatic hatchets made of jadeite and nephrite are known from Asia Minor, Siberia, Yu-Nan, and Japan, but these do not resemble the European large, flat hatchets.

3. The flat hatchets and others found in Europe were not derived from Asia. The minerals of which they are made are yet to be found *in situ* in Europe. Leaving out of consideration the bowl-

ders of nephrite in the North German low countries and the Monte Viso jadeite, discoveries will probably be made in the Swiss Alps and possibly also in other places.

4. The jadeite objects of America do not owe their origin to Asia, but the deposits of raw material are still to be discovered, and it is more than likely that they are in Mexico and along the banks of the Amazon.

5. In Oceanica nephrite is found in New Zealand and New Caledonia; jadeite is found in New Guinea. The original localities of the latter material are still to be discovered.

6. Possibly raw material may be found also in Africa.

The above paper was read before the Anthropological Society, at its 128th regular meeting, December 6, 1887. In the course of the discussion which followed Prof. F. W. CLARKE gave an account of a series of analyses of jade and jade-like minerals lately made by him in the laboratory of the United States Geological Survey. The list included nephrites from Alaska, partly worked and partly found in place by Lieutenant Stoney, jadeites from Mexico and Costa Rica, nephrite from New Zealand and Switzerland, a fibrolite implement from France, and saussurite objects from Swiss lake dwellings. He pointed out the chemical differences between jadeite and nephrite, as well as the physical distinctions between the two minerals, and argued against the Asiatic origin of American jades.

Mr. G. P. MERRILL followed with a statement of his work upon microscopic sections of the jades analyzed by Professor Clarke, exhibiting photomicrographs of several specimens. The nephrite in thin section is generally fibrous; the jadeite, on the other hand, appears granular.